NGSS Interim Assessments

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• Jeff Greig, Science Assessment – Connecticut State Department of Education
• Rachael Manzer, STEM Coach – Winchester Public Schools
Session Outline

• How the assessments should support the vision and key shifts of NGSS and CT’s proposed NGSS assessment system

• 3-D Interim Assessments Guided by Coherence, Shared Models of Learning, and Attention to Equity STEM Teaching Tool Micro-Dive

• Our Key Takeaways Important in our Learning about Interim Assessment

• Statewide Initiatives to Support Interim Assessment

• Example of Interim Assessments Embedded in Secondary (Grade 7) Curriculum

• Example of Interim Assessments Embedded in Elementary (Grades PreK-6) Curriculum
NGSS Assessments: Supporting the Vision and Key Shifts

- Less memorizing of factual knowledge and more sense making
- Use of real-world phenomena that engage students in problem solving
- 3-Dimensional science learning that integrates the SEPs, DCIs and CCCs
- Equitable opportunities for all students
**Proposed System of NGSS Assessments**

The goal is to provide useful information for a variety of purposes and audiences.

<table>
<thead>
<tr>
<th><strong>Formative Assessment Resources</strong>*:</th>
<th>Process used every day by teachers to monitor student learning in the classroom and help make ongoing instructional adjustments to better meet student needs. VOLUNTARY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Local Assessment Resources</strong>*:</td>
<td>Assessment resources, including PD supports, used to support ongoing instruction. Developed from a variety of sources including local CT school districts. VOLUNTARY</td>
</tr>
<tr>
<td><strong>Interim Assessments</strong>*:</td>
<td>Assessments administered at the end of units or grades to evaluate the learning of groups of students to inform curriculum and instruction at the local level. VOLUNTARY</td>
</tr>
<tr>
<td><strong>State Summative Assessments</strong>:</td>
<td>Assessments given at the end of learning (Grades 5, 8 and 11) to track student performance and inform decisions about curriculum, instruction, professional development, and policy for a variety of stakeholders. MANDATED BY FEDERAL AND STATE LAW</td>
</tr>
</tbody>
</table>

* Formative and local/interim assessment resources will come from a variety of sources and be shared by districts and states around the country.
3-D Interim Assessments Guided by Coherence, Shared Models of Learning, and Attention to Equity

STEM Teaching Tool Micro-Dive

Considering the following questions, take 5-7 mins to read the STT:

- What might be most important to think about related to interim assessments?
- What ideas or resources might support your work? How?

Small group discussion/Large group share out
Our Key Takeaways Important in our Learning about Interim Assessment

• To date, little emphasis has been placed on interim assessments (IAs).

• IAs can provide needed information that can be examined with other teachers and leaders within the same district to support targeted approaches for improving future instruction.

• IAs are common classroom assessments administered by groups of teachers . . . can be used to elicit insight into students’ facility with 3Ds in explaining phenomena or solving problems. Can provide information to individual teachers . . . can [also] be meaningfully aggregated to provide information at broader levels.
Our Key Takeaways Important in our Learning about Interim Assessment Cont.

• NOT as practice for assessments, [instead] as a bridge to help students connect what they are learning daily with opportunities they’ll have to engage in and demonstrate learning on summative assessments

• Issues to Consider: What coherent shared model of learning guides curriculum, instruction, and interim assessments

• Equity: Assessments should focus on relevant phenomena or problems to elicit explanations or solutions that are relatable to the intended audience and draw on student and community interests and expertise
NGSS Interim Assessments

Released on **October 15**

Same item clusters as in 2019

(will be administered individually instead of in pairs)

<table>
<thead>
<tr>
<th>Grade</th>
<th>No. of Item Clusters</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-5</td>
<td>14</td>
</tr>
<tr>
<td>6-8</td>
<td>20</td>
</tr>
<tr>
<td>High School</td>
<td>20</td>
</tr>
</tbody>
</table>

Educators can access NGSS interims in the Assessment Viewing Application through the web portal: [https://ct.portal.airast.org](https://ct.portal.airast.org)

Resources available:

- Next Generation Science Standards (NGSS) Interim Assessment Webinar
  - Next Generation Science Standards (NGSS) Interim Assessment Webinar – Slides [PPTX]
    - Updated November 6, 2018
- Next Generation Science Standards Interim Assessment Quick Guide [PDF]

Using NGSS Interim Assessments in the Classroom:
[https://www.youtube.com/watch?v=nrp9bSf2L7E&t=8s](https://www.youtube.com/watch?v=nrp9bSf2L7E&t=8s)
Considerations Prior to Using NGSS Interim Assessments

What purpose(s) will the NGSS interim assessments serve in my classroom, school or district?

Where do the NGSS interim assessments fit into my curriculum?

In which ways do the interims complement and support individualized and group instruction?

How will the results of the NGSS interim assessments be used?
Using the NGSS Interims to Inform Teacher Learning

NGSS Interim Assessments allow teachers to see what three-dimensional science assessment looks like and how it is different from traditional assessments.

Ask teachers to respond to the items and think about what students need to be able to do to be successful.
Some Questions for Teachers to Consider

Have teachers complete an NGSS interim item and then discuss the following questions:

• What is this item measuring?
• How challenging is the item (easy, moderate, or difficult)?
• What science practices do students use to answer the questions?
• What key concepts do students need to apply in answering the questions?
• How might the language used, information presented and/or manipulation skills present challenges for my students?
Using the NGSS Interims to Inform Student Learning

NGSS Interim Assessments allow teachers to **check student progress** throughout the year, gaining access to information that can be used to improve instruction and **help students meet the challenges** of “three-dimensional” standards.
NGSS Interim Assessment Results

First Stop in AIRWays – the Dashboard

| High School Science: Structures and Processes in Living Organisms | Unassigned | 1 | 0/21 |
| High School Science: Changes in Earth’s Climate | Unassigned | 1 | 2/17 |
| High School Science: Earth’s History and Systems | Spring | 3 | 3/20 |
| High School Science: Earth’s History and Systems | Unassigned | 7 | 5/20 |
| High School Science: Earth’s History and Systems | Winter | 4 | 3/20 |

Breakdown of student performance by scoring assertion

| Item Number | 1-1 | 1-1 | 1-3 | 1-4 | 1-5 | 1-6 | 1-7 | 1-8 | 1-9 | 1-10 | 1-11 | 1-12 | 1-13 | 2 | 2-1 | 2-2 | 2-3 | 2-4 | 2-5 | 2-6 | 2-7 | 2-8 | 2-8 |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|----|----|----|----|----|----|----|----|----|----|
| Total Items | 13  | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   |
|             | 4.2 | 0.57| 0.57| 0.31| 0.29| 0.71| 0.14| 0.12| 0.05| 0.06| 0.53| 0.37| 0.33| 2.58| 0.33| 0.41| 0.2 | 0.41| 0.31| 0.67| 0.51| 0.04 |
| Sample Student | 0   | 1   | 1   | 1   | 1   | 1   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   |

Scoring assertions indicate specific student performances included in an interim assessment item.
NGSS Interim Assessment Results

Results can be reviewed for each scoring assertion for groups of students or by individual student.

<table>
<thead>
<tr>
<th>Scoring Assertion</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The student correctly identifies the change in amplitude recorded in the simulation, providing some evidence of student ability to observe and summarize how waves change in different media.</td>
<td>✗</td>
</tr>
</tbody>
</table>
Looking at the Results

• Were there items/assertions on which most students struggled or did well on?

• Were there trends in student responses based on particular types of items/questions?

• Based on their performance, what types of instruction would benefit students?
Local Assessment Resources in Science (LARS)

Goal: To help school districts in CT share locally-developed NGSS assessment resources.

Two Types of Resources:
• Student assessments (Grades K-12)
• Teacher professional learning

Anyone will be able to submit resources to be considered for sharing.

Submitted resources will go through a review process to ensure they are of high quality.
LARS: Student Assessment Review Process

**Initial Submission of Resource**

**Science Task Prescreen**

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Is there a phenomenon or problem driving the task?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Can the majority of the task be answered <strong>without</strong> using information provided by the task scenario?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Can significant portions of the task be answered successfully by using <strong>rote knowledge</strong> (e.g., definitions, prescriptive or memorized procedure)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Does the majority of the task require students to <strong>use reasoning</strong> to successfully complete the task?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Does the task require students to use some understanding of <strong>disciplinary core ideas</strong> to successfully complete the task?</td>
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<td></td>
</tr>
<tr>
<td>6. Do students have to use at least one <strong>science and engineering practice</strong> to successfully complete the task?</td>
<td></td>
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<tr>
<td>7. Are the <strong>dimensions</strong> assessed separately in the majority of the task?</td>
<td></td>
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</tr>
<tr>
<td>8. Is the task <strong>coherent and comprehensible</strong> from the student perspective?</td>
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</tr>
</tbody>
</table>

Feedback will be provided to the submittter.

**In-Depth Assessment Task Review**
- Phenomena and/or Problem
- Alignment to 3D Performance Expectation(s)
- Scientific Accuracy
- Fair and Equitable to All Students
- Scoring Guidance and Teacher Supports

**Pilot Testing**
Scoring and Collection of Student Work

**Release to Public Web Site**

*We hope to make some resources available this winter.*

LARS Contact: Jeff Greig (jeff.greig@ct.gov)

In drawing any conclusions or making any decisions about student learning, **always use multiple sources of evidence**, including results from formative, local/interim, and summative assessments.
Southington’s Assessment Journey

Grade 7, Life Science Unit example

Disruptions In Ecosystems
American Museum of Natural History
The Lawrence Hall of Science
NSF Funded
Achieve endorsed for assessments
First Step – Claim, Evidence, Reasoning (CER)

• Bye Bye Birdie part 1 from Data Nuggets (http://datanuggets.org/)
  • Data Nuggets are free classroom activities, co-designed by scientists and teachers, designed to bring contemporary research and authentic data into the classroom. Data Nuggets include a connection to the scientist behind the data and the true story of their research. Each activity gives students practice working with “messy data” and interpreting quantitative information. Scoring rubric is provided to teachers.

• Student work was analyzed in grade level team and teachers zeroed in on student struggles to identify evidence and connect evidence to their claim (falling into the 3-5 grade band on the Engaging in argument from evidence progressions) but teachers found it difficult to hone in on student weaknesses.
**Data Nugget**

**Bye bye birdie? Part I**

Featured scientist: Richard Holmes from the Hubbard Brook Experimental Forest

**Research Background:**

The Hubbard Brook Experimental Forest is an area where scientists have collected ecological data for many years. It is located in the White Mountains of New Hampshire, and data collected in this forest helps uncover trends that happen over long periods of time. It is important to collect data on ecosystems over time because these patterns could be missed with shorter experiments.

Each spring, Hubbard Brook comes alive with the arrival of migratory birds. Many migrate from the tropics to take advantage of the abundant insects and the long summer days of northern areas, which are beneficial when raising young. **Avian ecologists** are scientists who study the ecology of birds. They have been keeping records on the birds that live in the experimental forest for over 40 years. These data are important because they represent one of the longest bird studies ever conducted.

Richard is an avian ecologist who began this study early in his career as a scientist. He was interested in how bird populations were responding to long-term environmental changes in Hubbard Brook. Every summer since 1969, Richard has taken his team of trained scientists, students, and technicians into the field to count the number of birds that are in the forest and identify which species are present. Richard’s team monitors populations of over 30 different bird species. They sun rise and travel to the far reaches of the forest, count all the birds they find. The team has been tra by sight, but also by their calls. Team members are bird is by hearing its call! The scientists record the different study areas, each of which are 10 hectare 19 football fields. Each of the four study areas cont arranged along transects that run east to west thr parallel routes along which the measurements are approximately 500 meters from the next. At certain stands and records all birds seen or heard during a the distance the birds are from the observer. The e season. By looking at bird abundance data, Richard trends that reveal how avian populations change or

**Scientific Question:** How has the total number of birds in the Hubbard Brook Experimental Forest changed over time?

**Scientific Data:**

Use the data below to answer the scientific question.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total number of birds counted / study area</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>158</td>
<td>1993</td>
</tr>
<tr>
<td>1970</td>
<td>163</td>
<td>1994</td>
</tr>
<tr>
<td>1971</td>
<td>212</td>
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<td>214</td>
<td>1996</td>
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<tr>
<td>1990</td>
<td>133</td>
<td>2014</td>
</tr>
<tr>
<td>1991</td>
<td>120</td>
<td>2015</td>
</tr>
<tr>
<td>1992</td>
<td>130</td>
<td>2016</td>
</tr>
</tbody>
</table>

**What data will you graph to answer the question?**

- Independent variable: 
- Dependent variable: 

**Below is a graph of the data.** Identify any changes, trends, or differences you see in your graph. Draw arrows pointing out what you see, and write one sentence describing what you see next to each arrow.

**Interpret the data:**

Make a claim that answers the scientific question.
Original Bye Bye Birdie Assessment

Given a scientific question, data table and graph students were asked:

• Identify any changes, trends, or differences you see in your graph. Draw arrows pointing out what you see, and write one sentence describing what you see next to each arrow.

• Interpret the data: Make a claim that answers the scientific question

• What evidence was used to write your claim? Reference specific parts of the tables or graph.

• Explain your reasoning and why the evidence supports your claim.
Revised Assessment

- Identify *one change* and *one trend* you see in the graph. Draw arrows pointing out what you see, and write one sentence describing what you see next to each arrow.

- Make a claim that answers the scientific question.

- Describe how evidence from the table supports your claim.
- Describe how evidence from the graph supports your claim.

- Use the table and/or graph to predict how many birds will be counted in the year you graduate from high school, 2025. Explain how you used the data to make your prediction.
Question: Record the question “What effect does a large population of deer have on an ecosystem?”

Evidence: Examine information and data from the reading.

Science Concepts: List any science concepts that are connected to the evidence and might help answer the question.

Scientific Reasoning: Describe the scientific reasoning that connects the evidence and science concepts to the question you are trying to answer.

Claim: Based on the evidence of patterns in the data and on your scientific reasoning, state your claim about the effect of a large population of deer on an ecosystem.
CER Rubric Developed for Grades 6-8

• The rubric to evaluate CERs provided consistency but limited SEP and CCC information

• Our emphasis the past two years has been on NGSS instruction with the CERs our primary assessment tool

• This year teachers have recognized the need to zero in on specific SEPs and CCCs

• And the need for 3-D assessments to measure student progress in SEPs and CCCs
Ongoing Assessment Work

• We began this year with discussions about what are we really measuring and where are our students struggling (SEPs and CCCs)

• We used appendices F (SEPs) and G (CCCs) to focus our assessments on Practices and cross cutting concepts.

• We revised the Bye Bye Birdie assessment and rubric to measure student abilities to analyze and interpret data, and identify patterns

• Teachers began identifying other assessments (CT Interims, SNAP, NextGenAssessment/Concord) that best fit our curriculum units
Ongoing Assessment Work – Use of CT Interims

**Grade 6 – Thermal Energy**

MS Matter and Its Interactions Item 1 (Tea Kettle) - Using Models, Cause and Effect

**Grade 7 – Growth in Living Things**

MS Matter and Its Interactions Item 2 (Chemical Reaction) – Analyzing Data, Systems

**Grade 8 – Forces and Motion**

MS Forces, Interactions and Energy Item 1 (block and string) – Analyzing data plan investigations
Ongoing Assessment Work

- We recognize the importance of reviewing student work (big lift – time consuming)

- We recognize the importance of the assessments “fitting” our curriculum – measuring practices and cross-cutting concepts consistent with our curriculum

- We will administer an interim assessment, all students in a grade level within a window of time, during each unit of study, by the midpoint of the unit – to allow time for the results to inform our instruction

- We’re using some readily available, some modified and some of our own via Canvas.
Winchester Public Schools Assessment Journey

A PreK-6 District
At Beginning Stages

Step 1: Teaching Science in Elementary Schools

- Professional Development
- Three Dimensional Instruction
- Unit Development/Revision
At Beginning Stages

Step 2: Designing a NGSS Assessment System
Formative Assessment - Progress Tracker

<table>
<thead>
<tr>
<th>Question</th>
<th>Source of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What We Figured Out

Source: Open SciEd
Formative Assessment

It's important to conserve fresh water because we'd all be dead for all the water on earth, the salt was 97%, Frozen Glaciers were and the actual fresh water was in. Think about it, there are 7 billion people on earth and 1% of fresh water is very scarce. Where would we run out from or later unless we do something about there are already people on earth that have no water. If we run out the plans will die the animals will die and all the people on earth will die. That's why it's important to conserve the little water we have left.

we can conserve water by not leaving the faucet on and for companies to reuse water instead of throwing it out.
Developing Rubrics for SEP

**INDICATORS OF MODELING**

- Develop and/or use models to describe and/or predict phenomena.
- Students collaborate to explain their reasoning about why/how phen. occurred and new ideas.
- Ss ask questions to clarify their explanations of model.
- Ss create a way (something) to make their thinking public.
- Ss test/compare their models to see if there is agreement b/w model & phenomenon.
- Ss argue about explanations in their model.
Interim Assessments

Locating the Lighthouse

Grade Level: 4

Phenomena: Coastal Erosion

Science & Engineering Practices:
- Asking Questions and - Defining Problems Analyzing and Interpreting Data

Crosscutting Concepts: Cause and Effect
## Interim Assessments

### Kentucky Through Course Tasks - 5th Grade

<table>
<thead>
<tr>
<th>Interim</th>
<th>Phenomena</th>
<th>CCC</th>
<th>SEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anna’s Sunglasses</td>
<td>Monthly Variation of Day Length Throughout Year</td>
<td>Cause and Effect</td>
<td>Using Mathematics and Computational Thinking, Constructing Explanations and Designing Solutions</td>
</tr>
<tr>
<td>More Mantise’s</td>
<td>Populations Within Ecosystems</td>
<td>Systems, System Models</td>
<td>Developing and Using Models, Engaging in Argument from Evidence</td>
</tr>
<tr>
<td>Matter Models</td>
<td>Evaporation of Water</td>
<td>Patterns, Cause and Effect</td>
<td>Developing and Using Models, Constructing Explanations and Designing Solutions</td>
</tr>
</tbody>
</table>
Interim Assessments
Recap ..... 

- Unit development/revision in process
- Using interim assessments that have been already created
- Interims occur within unit of study
- Interim administered to all students in a grade level at a specific date and time
- Teachers in grade level come together to analyze and discuss results of interims
Thank You

Contact Information

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• John Duffy (jduffy@southingtonschools.org)
• Jeff Greig (Jeff.Greig@ct.gov)
• Rachael Manzer (rachael.manzer@winchестerschools.org)